

# 2mm PITCH METRIC CONNECTORS FOR PCB CONNECTION

## FCN-086 /087 SERIES

### ■ OVERVIEW

Fujitsu's 2mm hard metric connector F-PACK-3 (FCN-086/087 series) are connectors for connecting boards developed to support high-speed transmission/high density packaging of communication equipment, conforms to IEC 917 (DIN 43355) and IEC 61076-4-101, and supports compact PCI. Product meets Bellcor 1217. To support high-speed transmission, these connectors implement low inductance, low cross-talk, and matching characteristic impedance (50 ohms), exhibiting superb transmission characteristics.

Connection with the PCB is solderless (press fit) for both the plug/socket side, making mounting cost effective. Insertion connections are completely unnecessary since a polarity key is supported.

Plug contact has a four level sequence structure that makes connection/disconnection in an active state possible. Terminals have a five level pin length to support various applications. New customized connectors can be supported by freely combining the pin lengths of contacts and terminals.

For shield plate products, which support high-speed transmission based on standard products, 5 row 55, 95, 110, 110 (with key) and 125 contact, plugs support 77, 133, 154 and 175 contacts. The shield plate corresponds to the respective number of contacts, and the standard is post attachment. Sockets can also be shipped with shields pre-attached.

8 row products are also in the series. Consult factory for your requirements.

Fujitsu has developed a new high density power connector (25% denser) to improve operability.

A double press fit, which can connect two printed boards with one connector, greatly contributes to improved mounting and decreasing cost. Consult factory for details.

# FCN-086 / 087 Series

## ■ SPECIFICATIONS

| Item                        | Specification               |                              |
|-----------------------------|-----------------------------|------------------------------|
|                             | Standard connector          | Power connector              |
| Operating temperature range | -55° C to +125° C           | -40° C to +85° C             |
| Current rating              | 1A DC max. (75° C)          | 7A DC/contact max. (75° C)   |
| Voltage rating              | 500V AC r.m.s               | 56V DC                       |
| Contact resistance          | 20mohms max. (DC 20mV,10mA) | 20mohms max. (DC 20mV, 10mA) |
| Insulation resistance       | 10,000 Mohms min. (100V DC) | 10,000 Mohms min. (100V DC)  |
| Dielectric strength         | 750V AC for 1 minute        | 600V AC for 1 minute         |
| Insertion/Withdrawl life    | 125 times                   | 250 times                    |
| Insertion force             | 0.75N/pin min.              | 20N/connector max.           |
| Withdrawl force             | 0.15N/pin min.              | 1N/connector min.            |

## ■ CHARACTERISTICS

| Item                     | Material   |
|--------------------------|------------|
| Characteristic impedance | 50 ohms    |
| Transmission speed       | 300 MHz    |
| Near end cross talk      | 4.3 % max. |

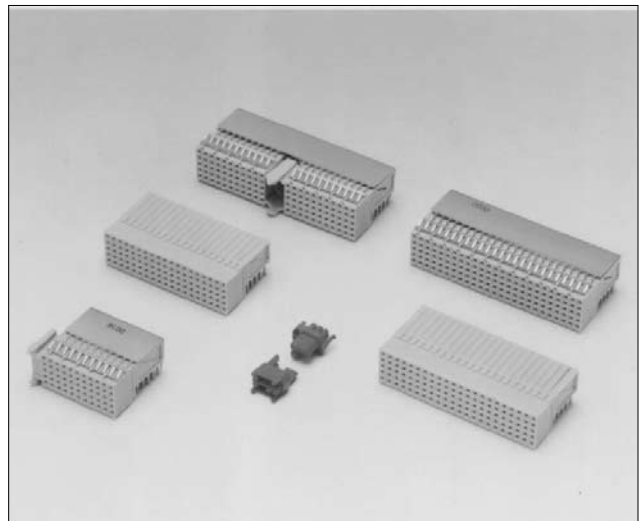
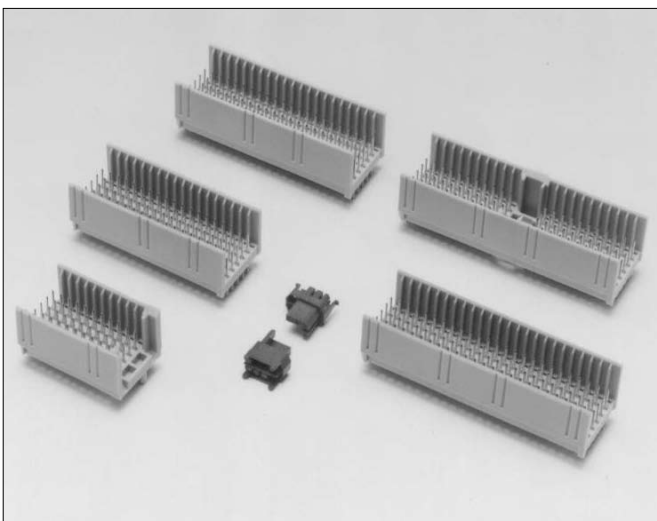
## ■ MATERIALS

| Item      | Material   |
|-----------|--|
| Insulator | Polyester resin (UL94V-0)  |
| Conductor | Copper alloy   |
| Plating   | Press fit: Solder<br>Press fit other: PAGOS<br>Contact area: Gold (PAGOS)<br>Lead / press fit area: Solder |

## ■ CONFIGURATION OF F&T 2 MM H.M. CONNECTOR

### 1. Basic configuration of socket/plug

There are five types of sockets: three basic types: type A (110 contacts), type B (125 contacts), and type C (55 contacts), and a 110 contact and 95 contact types. Many coding keys are in the series to prevent insertion errors.

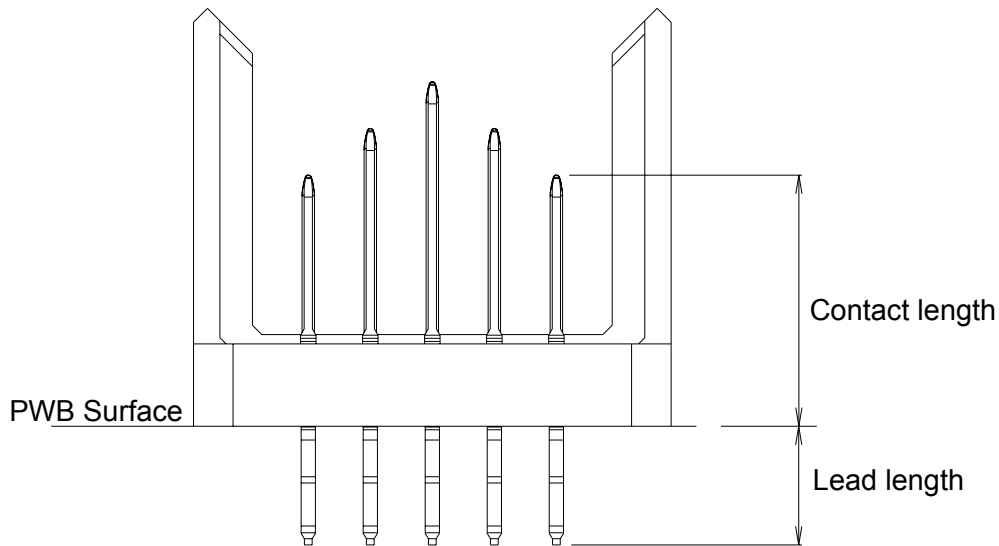


## ■ TERMINAL CONFIGURATION OF PLUG

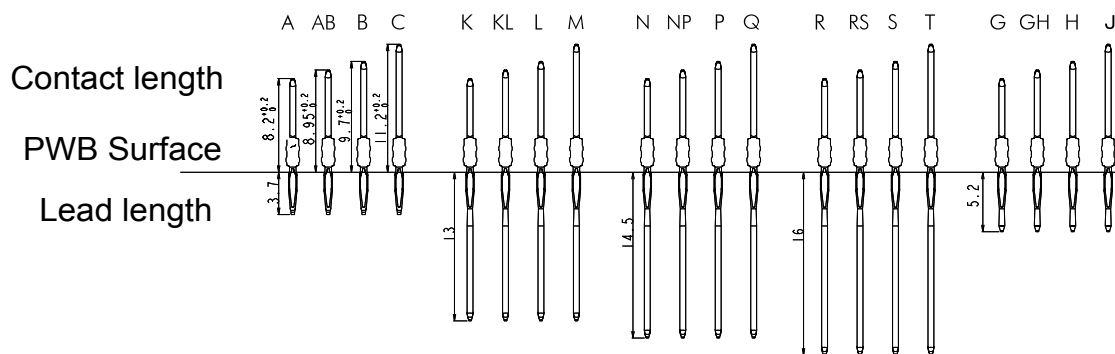
The contact pins have a three-level sequence structure and can be connected/disconnected in an active state. The terminal side can support various applications with four types of length. These combinations allow 20 types of terminals.

Relationship between housing and terminals

Terminal types in the series



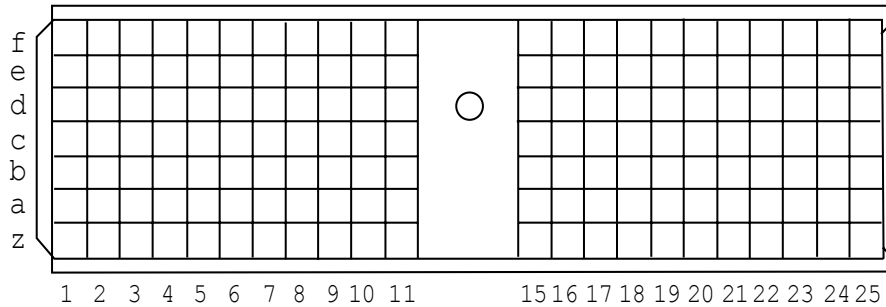
PC Board Face  
Contact Types



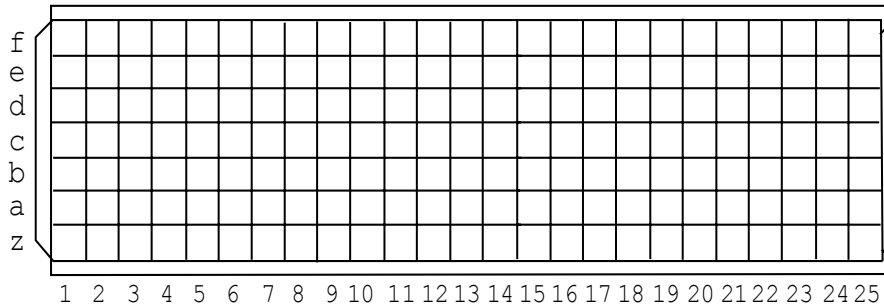
## Request Form for Customer Specific Pin Arrangement for 2mm Connectors

Part of the benefit of using the FCN-086 2mm Backplane connector is the flexibility of creating unique contact loads in the connector body. To define your needs, make a photocopy of the following page(s), select your connector needs, and fill in the blanks with the specific contact designation (see page 5 for available contacts). Forward to Fujitsu for quotation and part number assignment. (Please note that the pin arrangement drawings are "View from the Mating Side").

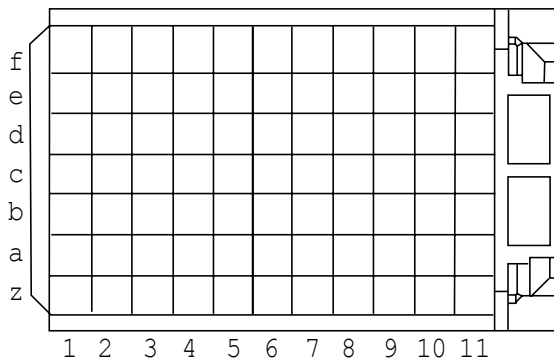
### 1. TYPE A (110 pos. with polarization key) (5+2)



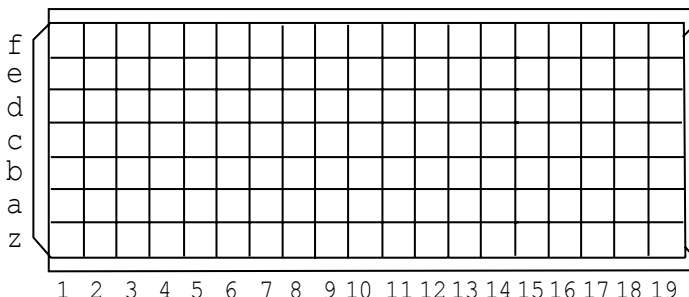
### 2. TYPE B (125 pos.) (5+2)



### 3. TYPE C (55 pos.) (5+2)



### 4. 95 pos. (5+2)

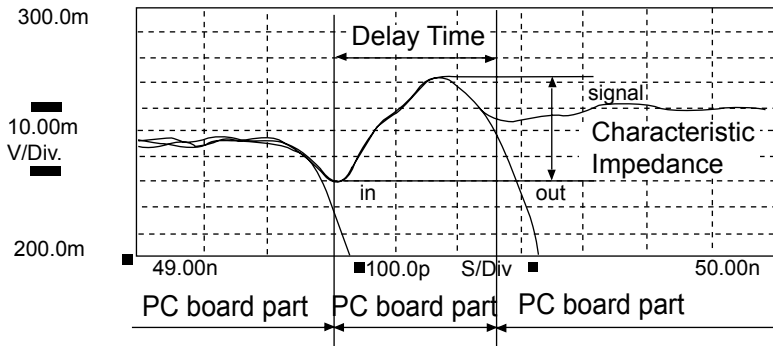


## TRANSMISSION CHARACTERISTICS

The transmission characteristics were designed to an optimum level by repeating various transmission characteristics simulations when the structure was designed, so as to improve the transmission characteristics of this connector. The characteristic impedance and the measurement device of the connector are shown below.

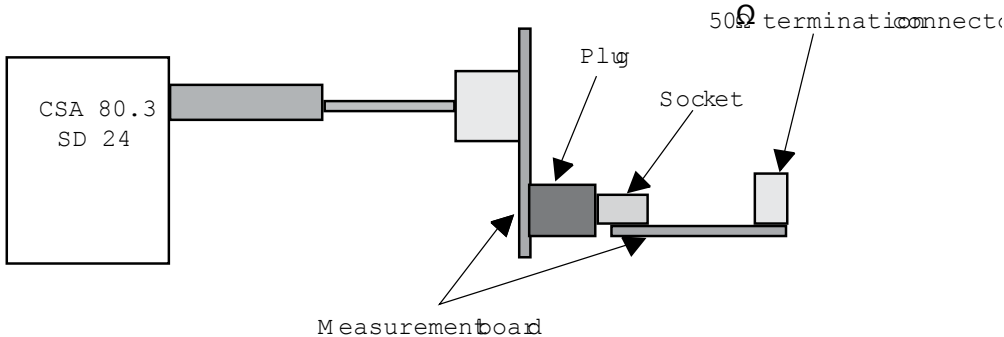
| Measurement Point                     | Measurement Result |              |              |              |  |
|---------------------------------------|--------------------|--------------|--------------|--------------|--|
|                                       | Fujitsu Components |              |              |              |  |
| At Start                              | 100 ps             | 300 ps       | 500 ps       | 1 ns         |  |
| Frequency: Hz                         | 1.75 GHz           | 580 MHz      | 350 MHz      | 175 MHz      |  |
| Characteristic Impedance ( $\Omega$ ) | 45.3 to 64.0       | 48.2 to 56.8 | 49.2 to 54.6 | 49.3 to 52.8 |  |
| Near/Far end cross talk: %            | 1.96/1.14          | 1.49/0.78    | 1.06/0.51    | 0.71/0.27    |  |
|                                       | Other Supplier     |              |              |              |  |
| At Start                              | 100 ps             | 300 ps       | 500 ps       | 1 ns         |  |
| Frequency: Hz                         | 1.75 GHz           | 580 MHz      | 350 MHz      | 175 MHz      |  |
| Characteristic Impedance ( $\Omega$ ) | 47.4 to 66.1       | 48.2 to 56.8 | 49.5 to 59.2 | 47.7 to 53.5 |  |
| Near/Far end cross talk: %            | 2.24/1.41          | 1.57/0.98    | 1.14/0.67    | 0.78/0.35    |  |

a ● ○ ● ○ ○ ○  
 b ○ ● ○ ○ ○ ●  
 c ● ○ ○ ○ ● ●  
 d ○ ○ ○ ● ● ○  
 e ○ ○ ● ○ ○ ●  
 ○ Ground  
 ● Not connected  
 ○ Measurement signal



- 1.Measurement voltage:  $V_{in} = 5.0V$
- 2.Rise time:  $T_r = 100ps, 300ps, 500ps, 1ns$
- 3.Measurement device: TDR measurement device CSA803 and SD24 (Tektronix)
- 4.Measurement system

Coaxial cable for measurement



# FCN-086 /087 Series Compact PCI / VME

## ■ STANDARD AND HOT SWAP PART NUMBERS

Coding Keys for Daughter Card

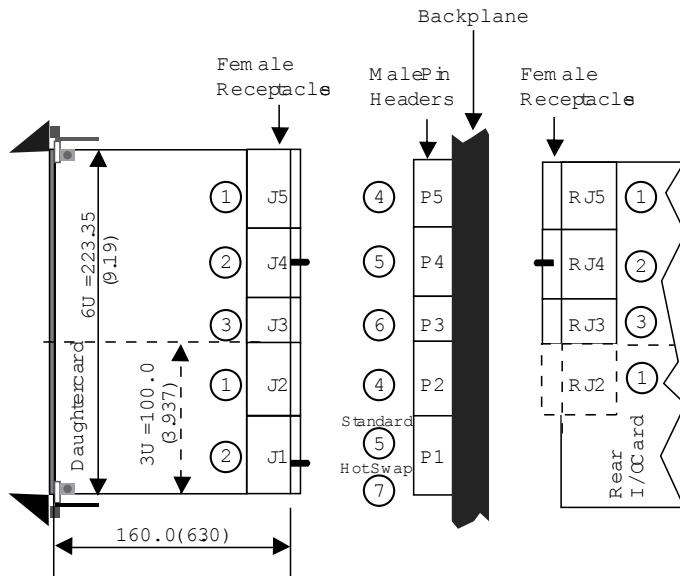
FCN-086B1278 - 3.3V  
or  
FCN-086B2348 - 5.0V

J1

Coding Keys for Midplane/Backplane

FCN-086A3456 - 3.3V  
or  
FCN-086A2348 - 5.0V

P1



| Reference Number | Part Number            | Designations     |
|------------------|------------------------|------------------|
| ①                | FCN-086J110-G111A-BCR  | J5, J2, RJ5, RJ2 |
| ②                | FCN-086J110-G111-BCR   | J4, J1, RJ4      |
| ③                | FCN-086J095-G111A-BCR  | J3, RJ3          |
| ④                | FCN-086P154-G/111A-BCR | P5, P2           |
| ⑤                | FCN-086P154-G/104-BCR  | P4, P1           |
| ⑥                | FCN-086P133-G/111A-BCR | P3               |
| ⑦                | FCN-086P154-G/114-BCR  | P1               |
| ⑧                | Future Products        | J4, P5           |
| ⑨                | FCN-086P154-G/516-BCR  | P4               |

## ■ COMPUTER TELEPHONY PART NUMBERS

Coding Keys for Daughter Card

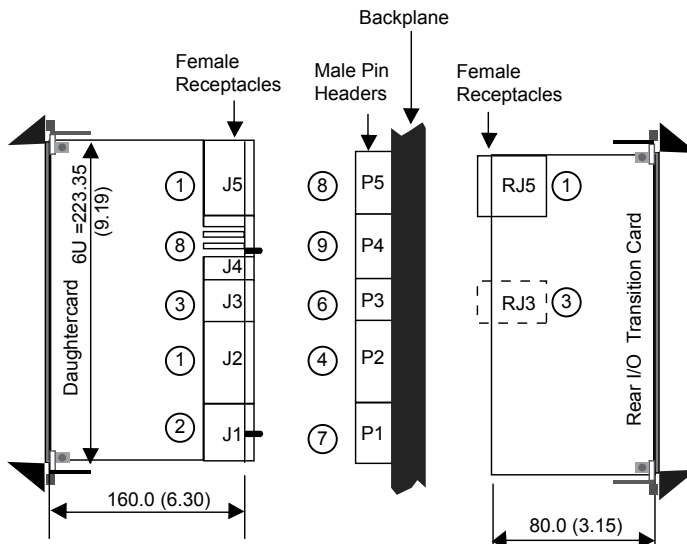
FCN-086B1278 - 3.3V  
or  
FCN-086B2348 - 5.0V  
FCN-086B3567 - J4

J1

Coding Keys for Midplane/Backplane

FCN-086A3456 - 3.3V  
or  
FCN-086A2348 - 5.0V  
FCN-086B1248 - P4

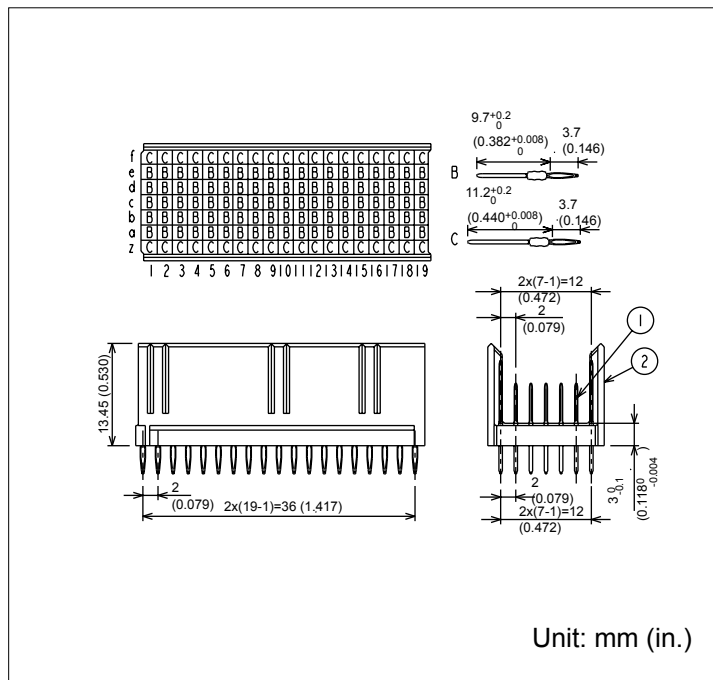
P1



## P3 TYPE 3

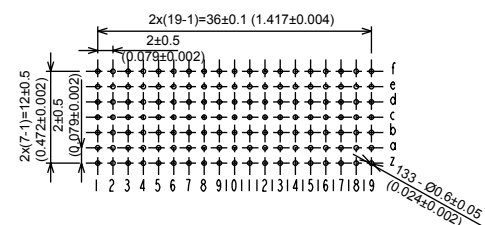
### STRAIGHT PLUG (133 POSITIONS)

#### ■ DIMENSIONS



#### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)  
 Drill hole Diameter:  $\phi 0.7 \pm 0.025$  mm (.028 in.)  
 Through hole diameter (after plating):  $\phi 0.6 \pm 0.05$  mm (.024 in.)

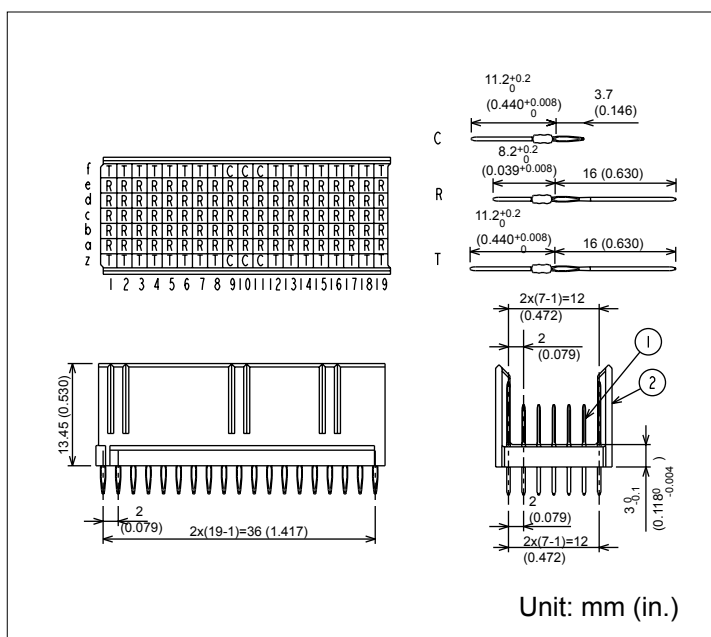


#### ■ ORDERING PART NUMBER: FCN-086P133-G/111A-BCR

## P3 TYPE B MALE FEED THROUGH

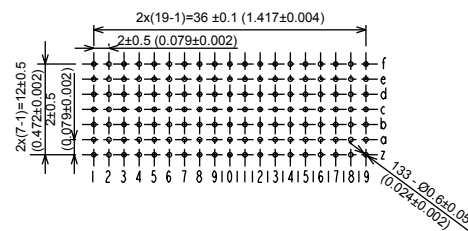
### STRAIGHT PLUG (133 POSITIONS)

#### ■ DIMENSIONS



#### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)  
 Drill hole Diameter:  $\phi 0.7 \pm 0.025$  mm (.028 in.)

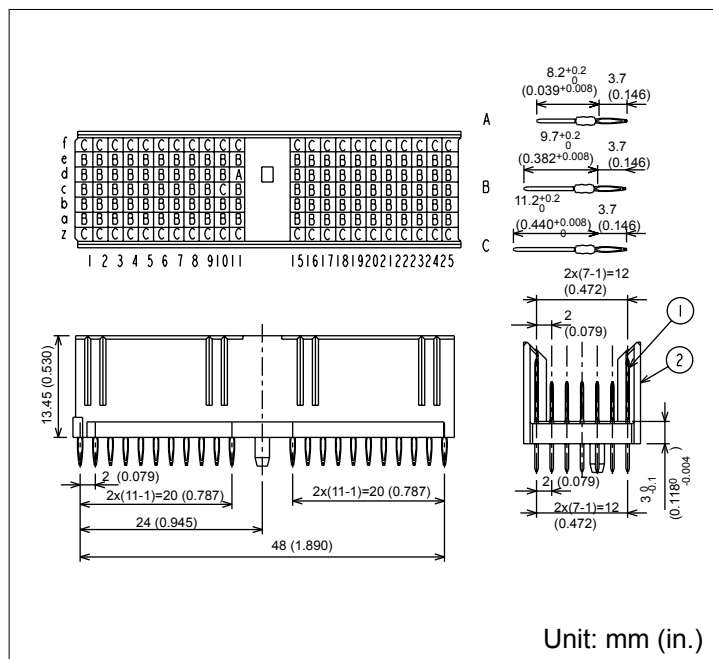


#### ■ ORDERING PART NUMBER: FCN-086P133-G/502A-BCR

## P1/P4 TYPE A

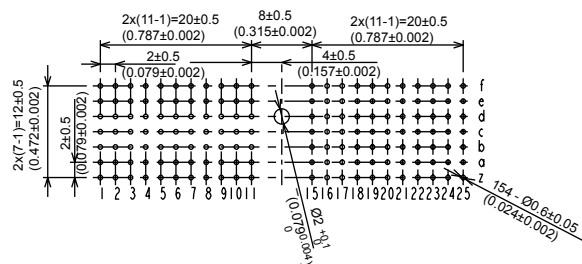
### STRAIGHT PLUG (154 POSITIONS)

#### ■ DIMENSIONS



#### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)  
 Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)  
 Through hole diameter (after plating):  $\varnothing 0.6 \pm 0.05$  mm (.024 in.)

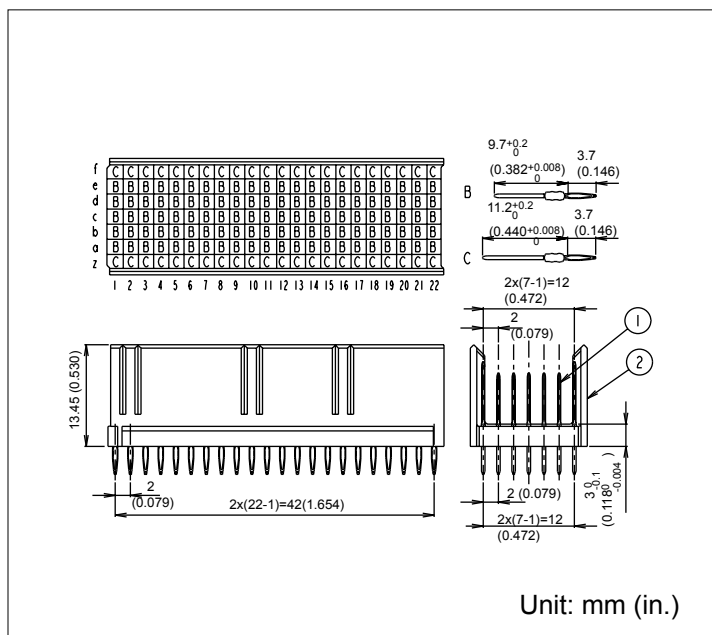


■ ORDERING PART NUMBER: FCN-086P154-G/104-BCR

## P2/P5 TYPE B

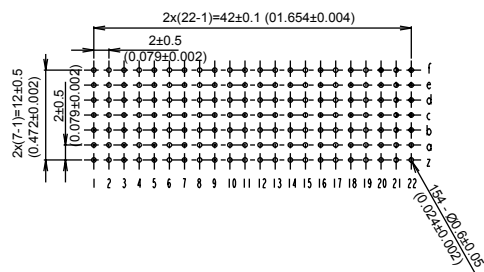
### STRAIGHT PLUG (154 POSITIONS)

#### ■ DIMENSIONS



#### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)  
 Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)  
 Through hole diameter (after plating):  $\varnothing 0.6 \pm 0.05$  mm (.024 in.)

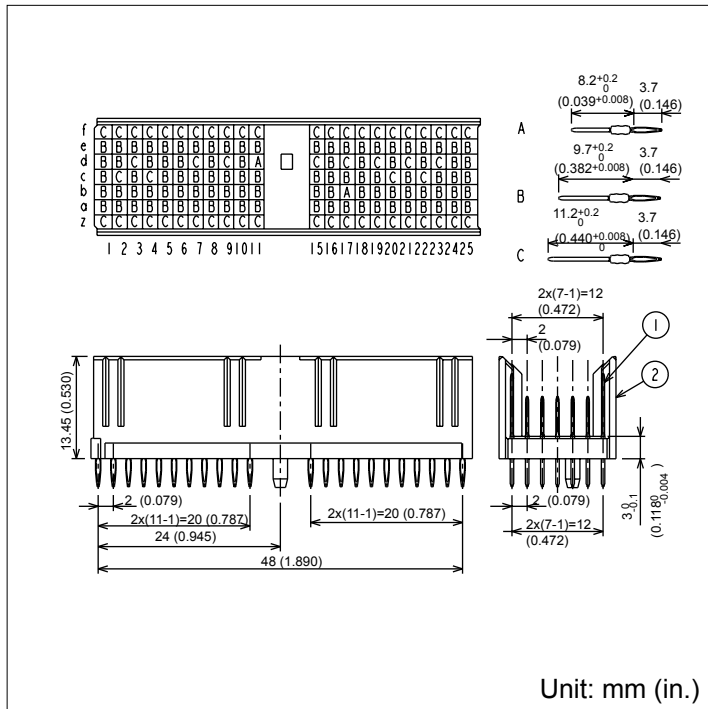


■ ORDERING PART NUMBER: FCN-086P154-G/111A-BCR



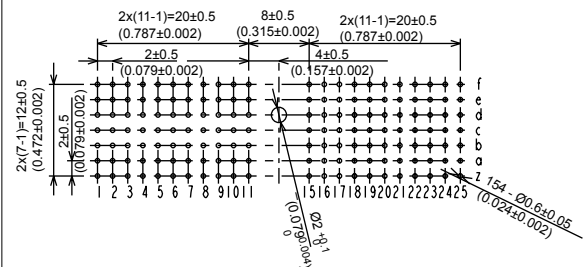
## P1 TYPE A HOT SWAP 110 SIGNAL CONNECTOR STRAIGHT PLUG (154 POSITIONS)

### ■ DIMENSIONS



### ■ MOUNTING HOLE LAYOUT

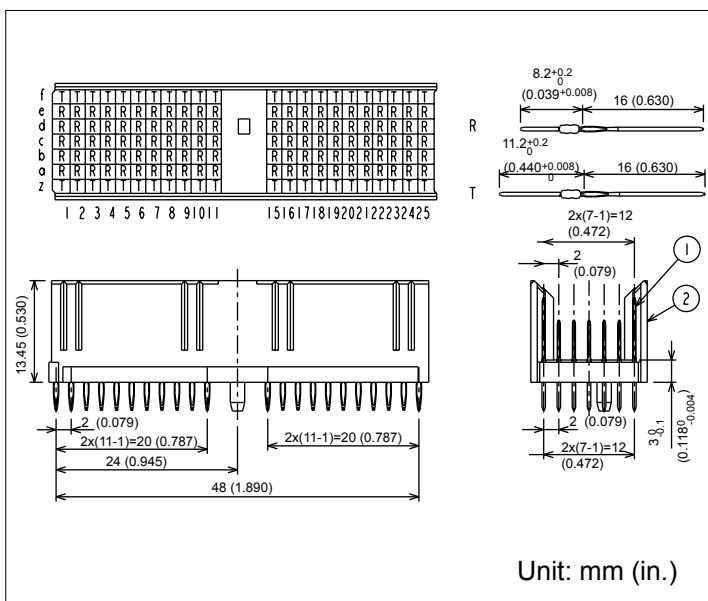
Thickness: 1.4 to 5.6 mm (.055 to .220 in.)  
Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)  
Through hole diameter (after plating):  $\varnothing 0.6 \pm 0.05$  mm (.024 in.)



### ■ ORDERING PART NUMBER: FCN-086P154-G/114-BCR

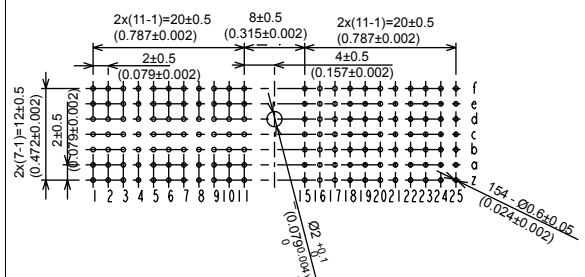
## P4 TYPE A MALE FEED THROUGH STRAIGHT PLUG (154 POSITIONS)

### ■ DIMENSIONS



### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)  
Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)  
Through hole diameter (after plating):  $\varnothing 0.6 \pm 0.05$  mm (.024 in.)

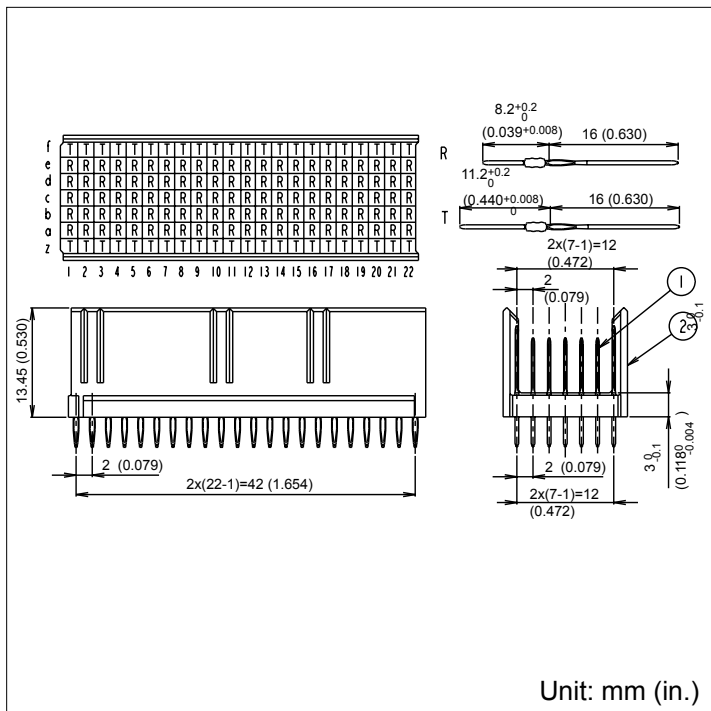


### ■ ORDERING PART NUMBER: FCN-086P154G/401-BCR

## TYPE 2 FEED THROUGH

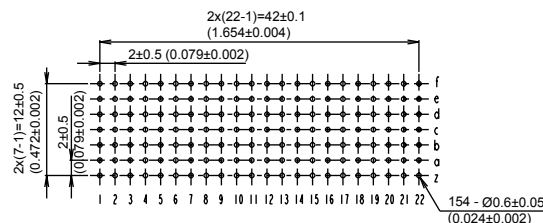
## STRAIGHT PLUG (154 POSITIONS)

### ■ DIMENSIONS



### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)  
 Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)  
 Through hole diameter (after plating):  
 $\varnothing 0.6 \pm 0.05$  mm (.024)

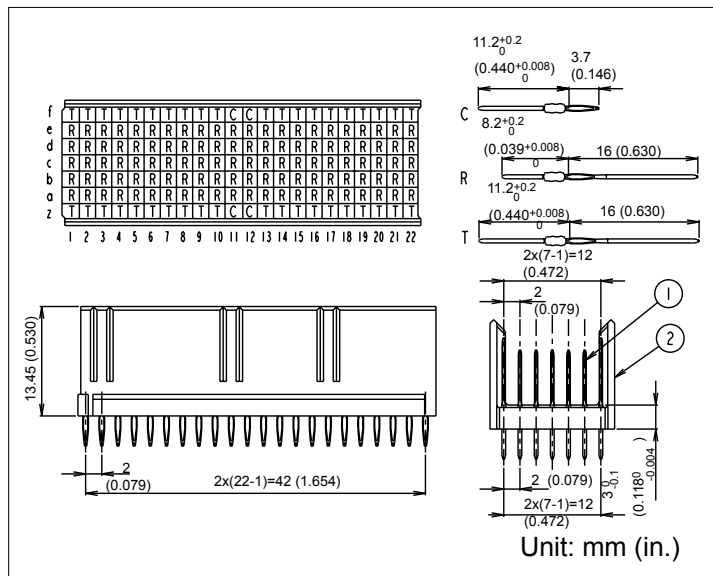


### ■ ORDERING PART NUMBER: FCN-086P154-G/401A-BCR

## TYPE 2 FEED THROUGH

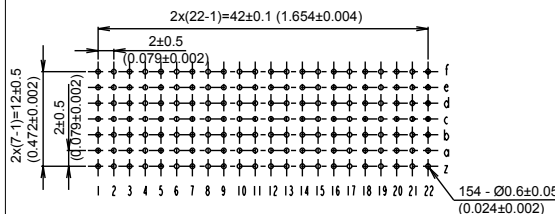
## STRAIGHT PLUG (154 POSITIONS)

### ■ DIMENSIONS



### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)  
 Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)  
 Through hole diameter (after plating):  
 $\varnothing 0.6 \pm 0.05$  mm (.024)

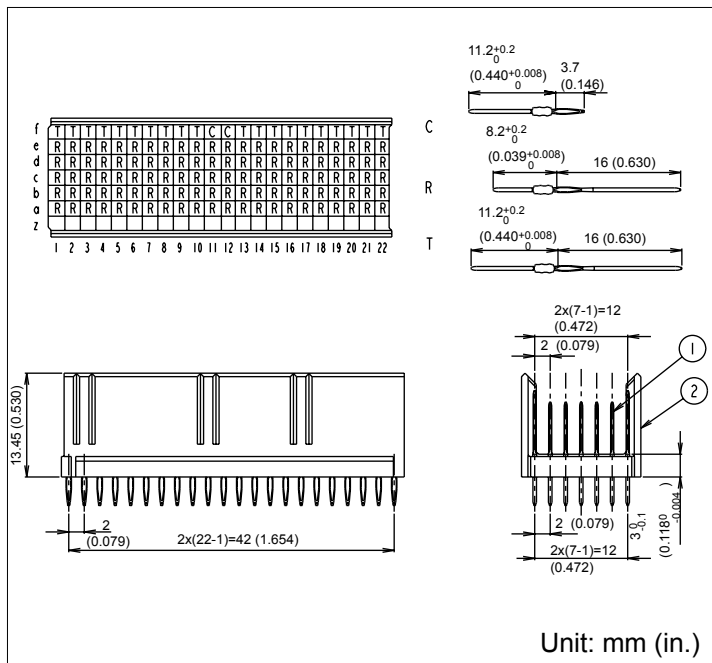


### ■ ORDERING PART NUMBER: FCN-086P154-G/502A-BCR

## P5 TYPE B FEED THRU COMPUTER TELEPHONY CONNECTOR

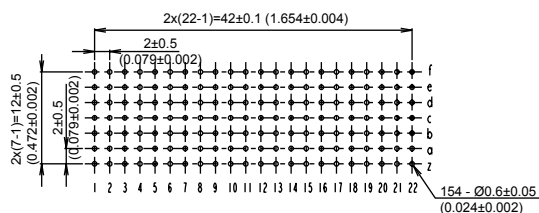
### STRAIGHT PLUG (154 POSITIONS)

#### ■ DIMENSIONS



#### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)  
 Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)  
 Through hole diameter (after plating):  $\varnothing 0.6 \pm 0.05$  mm (.024 in.)

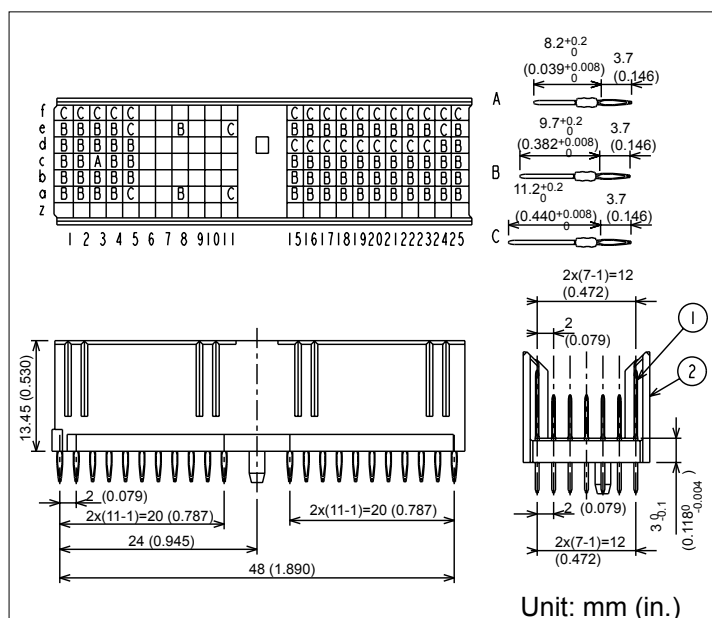


#### ■ ORDERING PART NUMBER: FCN-086P154-G/503A-BCR

## P4 TYPE A COMPUTER TELEPHONY CONNECTOR

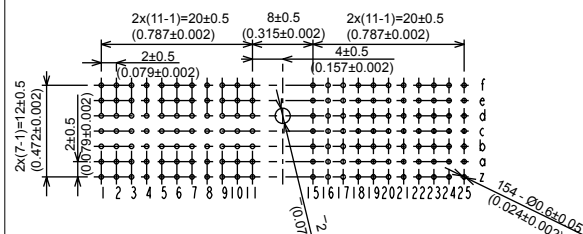
### STRAIGHT PLUG (154 POSITIONS)

#### ■ DIMENSIONS



#### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)  
 Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)  
 Through hole diameter (after plating):  $\varnothing 0.6 \pm 0.05$  mm (.024 in.)

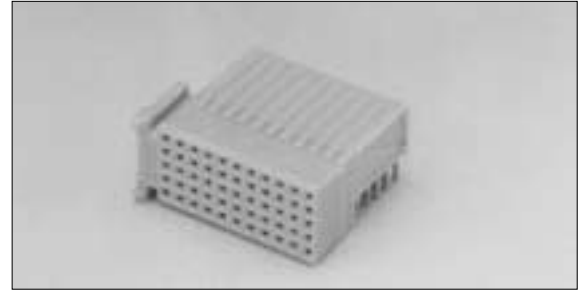
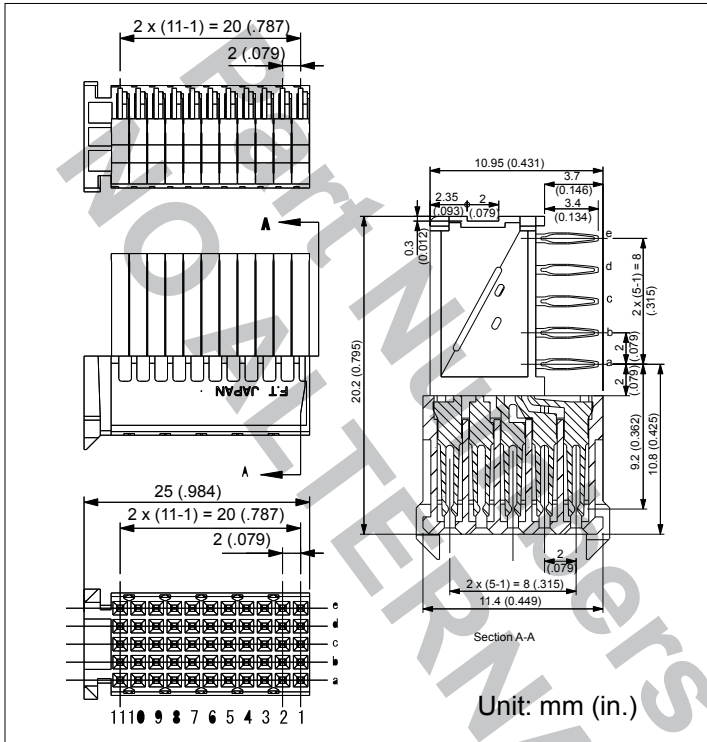


#### ■ ORDERING PART NUMBER: FCN-086P154-G/516-BCR

# FCN-086 / 087 Series

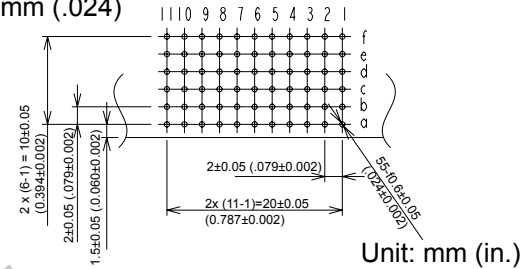
## SOCKET: 55 CONTACTS

### ■ DIMENSIONS



### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 2.0 mm (.055 to .220 in.)  
 Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)  
 Through hole diameter (after plating):  $\varnothing 0.6 \pm 0.05$  mm (.024 in.)

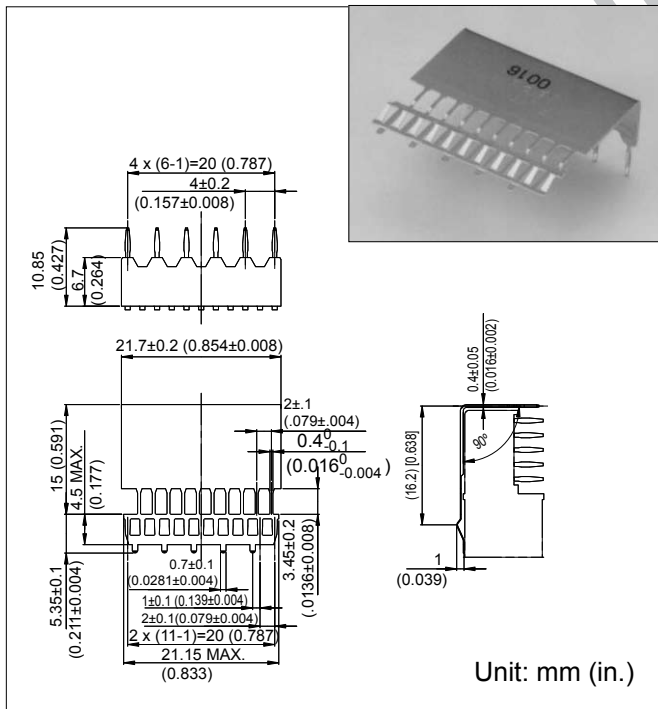


### ■ ORDERING PART NUMBER: FCN-086J055-G/101-BCR

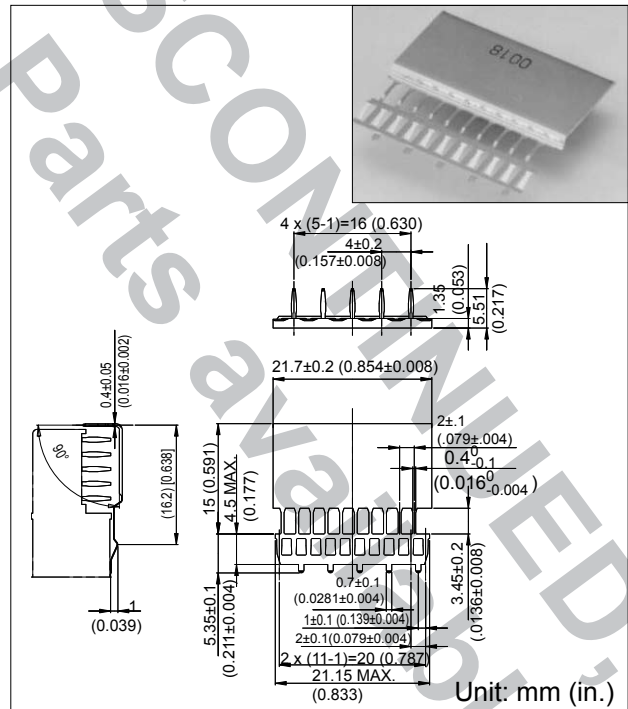
FCN-086J055-G/111-BCR (with pre-attached upper shield)

## SHIELD PLATE

### ■ DIMENSIONS



### ■ DIMENSIONS



### ■ ORDERING PART NUMBER:

FCN-086J055-G/USD-BCR (top shield plate)

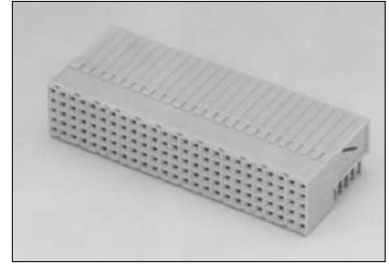
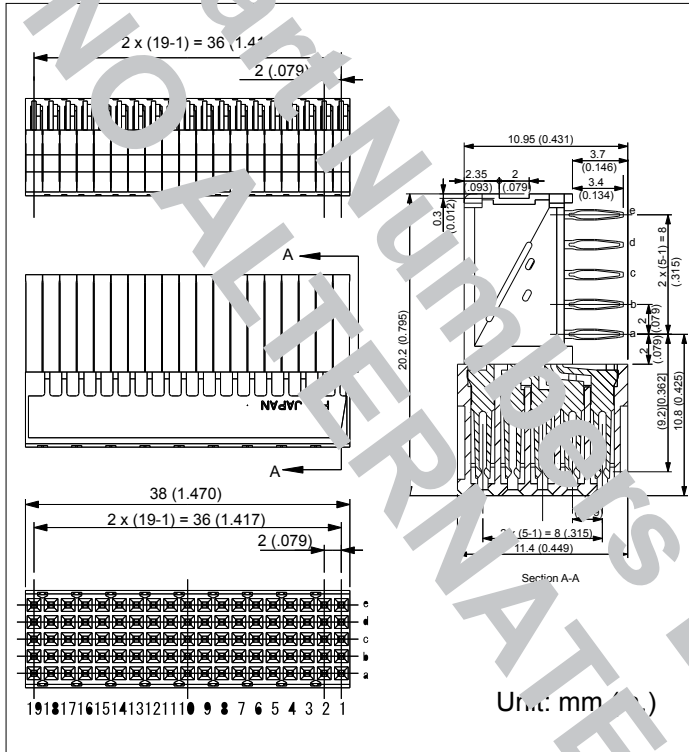
### ■ ORDERING PART NUMBER:

FCN-086J055-G/LSD-BCR (bottom shield plate)

## FCN-086 / 087 Series

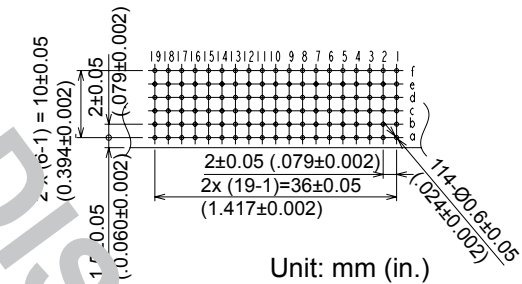
**SOCKET: 95 CONTACTS**

## ■ DIMENSIONS



## ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 2.0 mm (.055 to .220 in.)  
 Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)  
 Through hole diameter (after plating):  $\varnothing 0.6 \pm 0.05$  mm (.024)

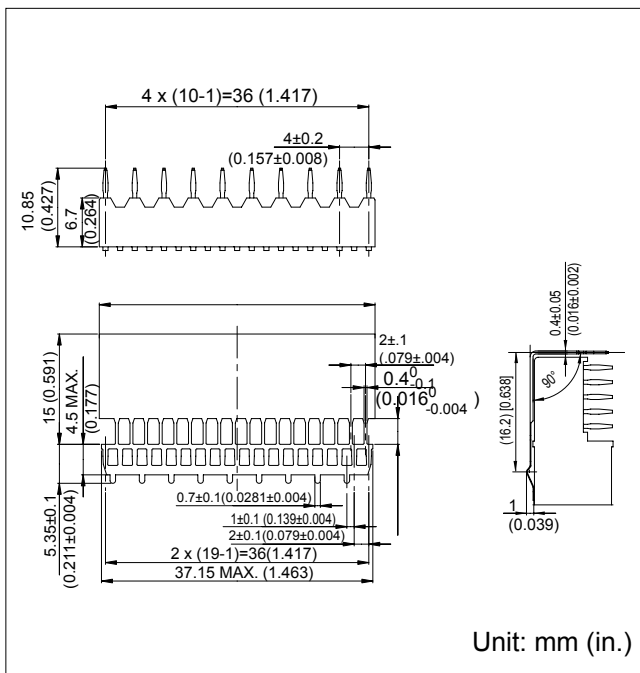


■ **ORDERING PART NUMBER:** FCI-086J095-G101-BCR

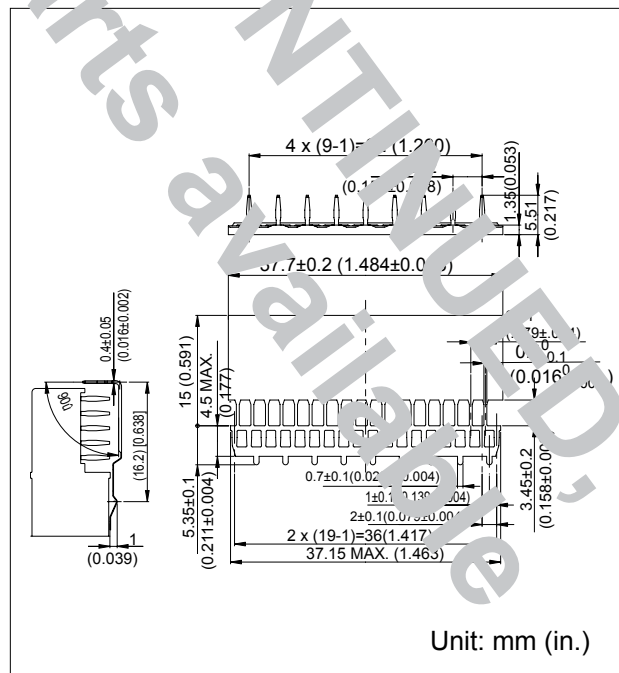
FCN-086 5-G/11 A-B CR (with pre-attached upper shield)

## SHIELD PLATE

## ■ DIMENSIONS



## 2 DIMENSIONS



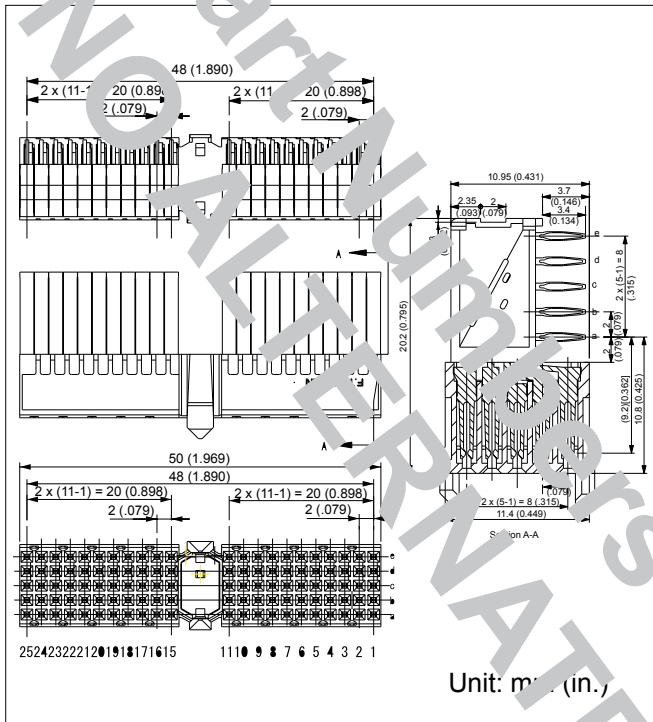
■ **ORDERING PART NUMBER:**  
FCN-086J095-G/VSD-BCR (top shield plate)

■ **ORDERING PART NUMBER:**  
FCN-086J095-G/MSD-BCR (bottom shield plate)

# FCN-086 / 087 Series

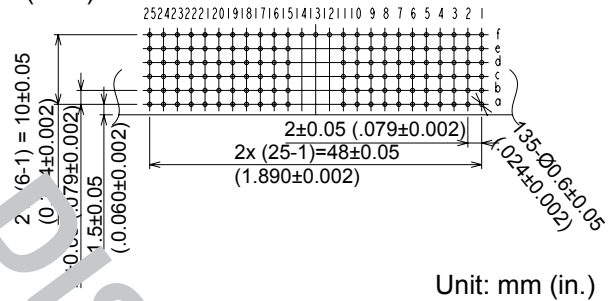
## SOCKET: 110 CONTACTS

### ■ DIMENSIONS



### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 2.0 mm (.055 to .220 in.)  
 Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)  
 Through hole diameter (after plating):  $\varnothing 0.6 \pm 0.05$  mm (.024 in.)

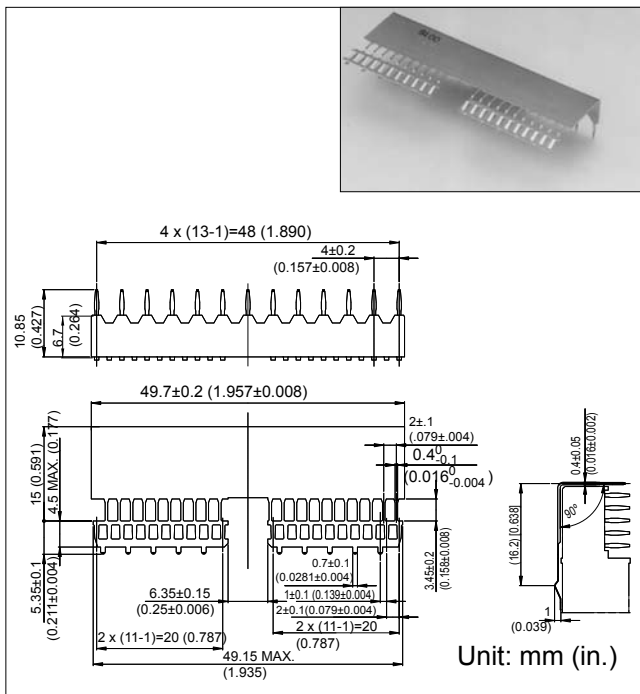


### ■ ORDERING PART NUMBER: FCN-086J110-G/111-BCR

FCN-086J110-G/111-BCR (with pre-attached upper shield)

## SHIELD PLATE

### ■ DIMENSIONS

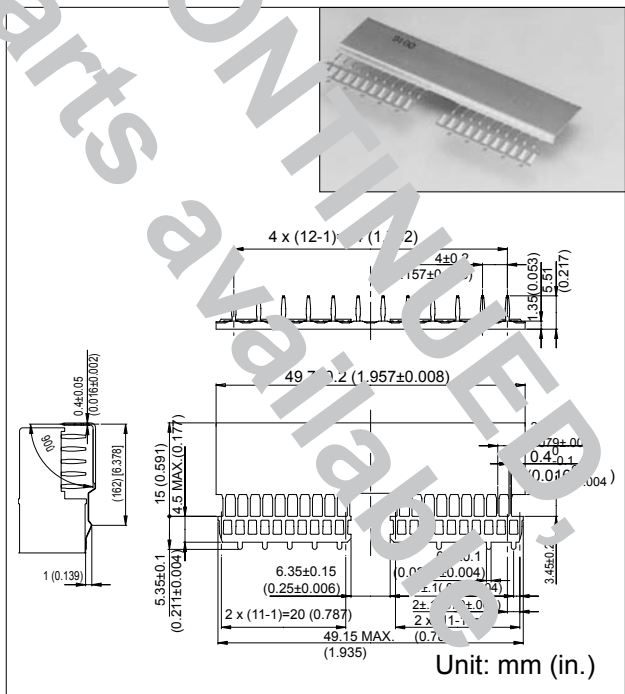


■ ORDERING PART NUMBER:  
 FCN-086J110-G/USD-BCR (with key, top shield plate)

Specifications  
 subject to change

Dimensions are in millimeters (inches)

### ■ DIMENSIONS



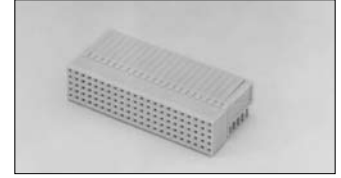
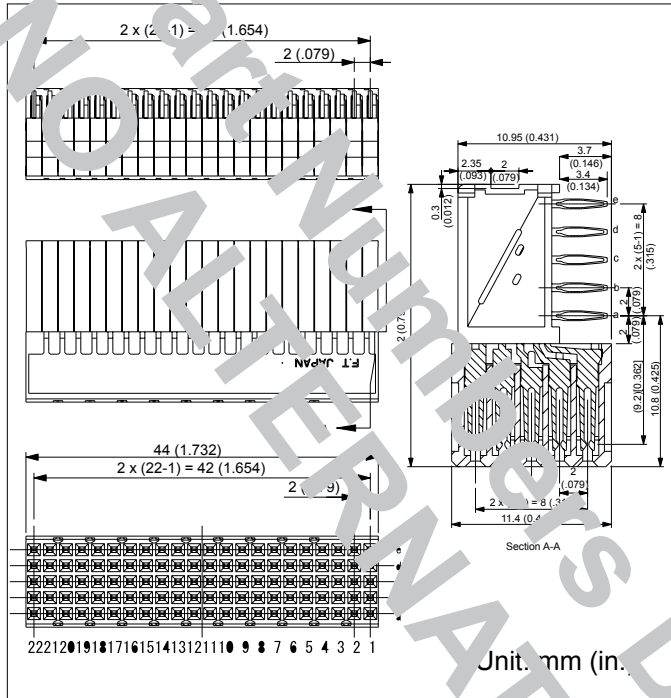
■ ORDERING PART NUMBER:  
 FCN-086J110-G/LSD-BCR (with key, bottom, shield plate)

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# FCN-086 / 087 Series

## SOCKET: 40 CONTACTS WITHOUT KEY

### ■ DIMENSIONS



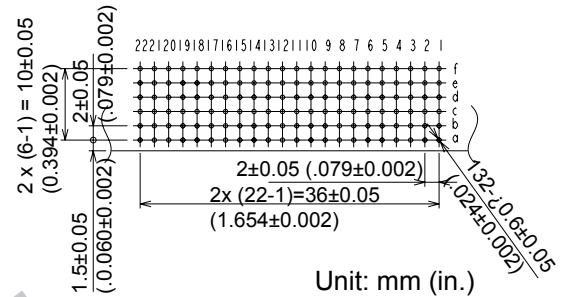
### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 2.0 mm (.055 to .020 in.)

Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)

Through hole diameter (after plating):

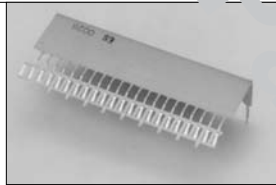
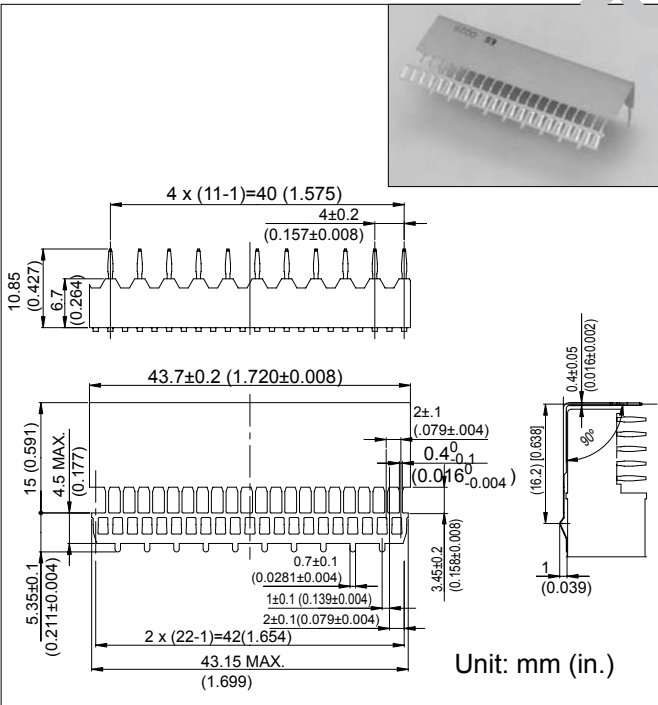
$\varnothing 0.6 \pm 0.05$  mm (.024)



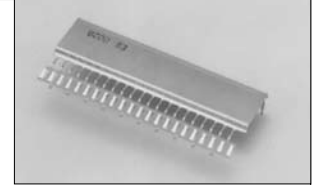
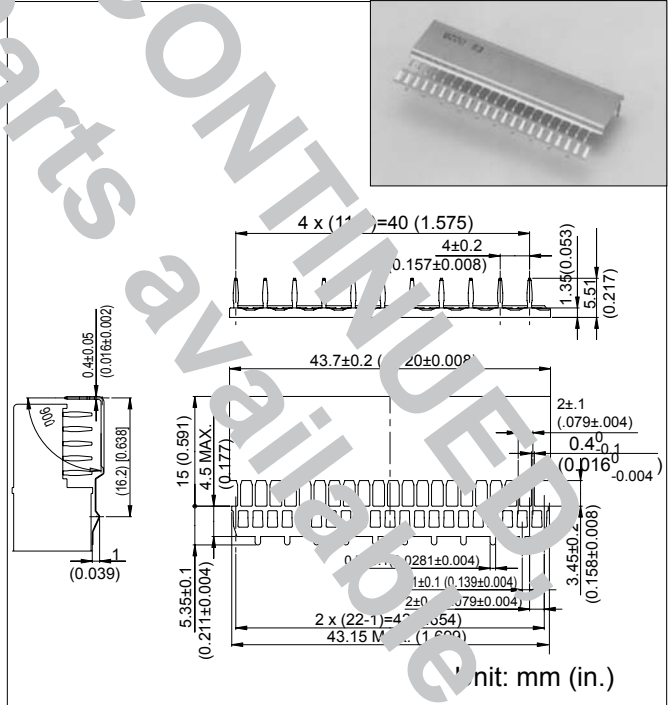
### ■ ORDERING PART NUMBER: FCN-086J110-G/101A-BCR

## SHIELD PLATE

### ■ DIMENSIONS



### ■ DIMENSIONS



### ■ ORDERING PART NUMBER:

FCN-086J110-G/VSD-BCR (without key, top shield plate)

### ■ ORDERING PART NUMBER:

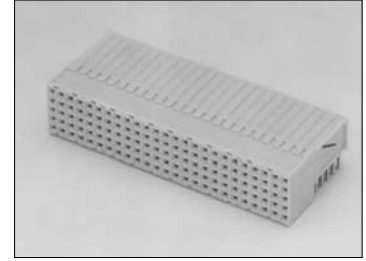
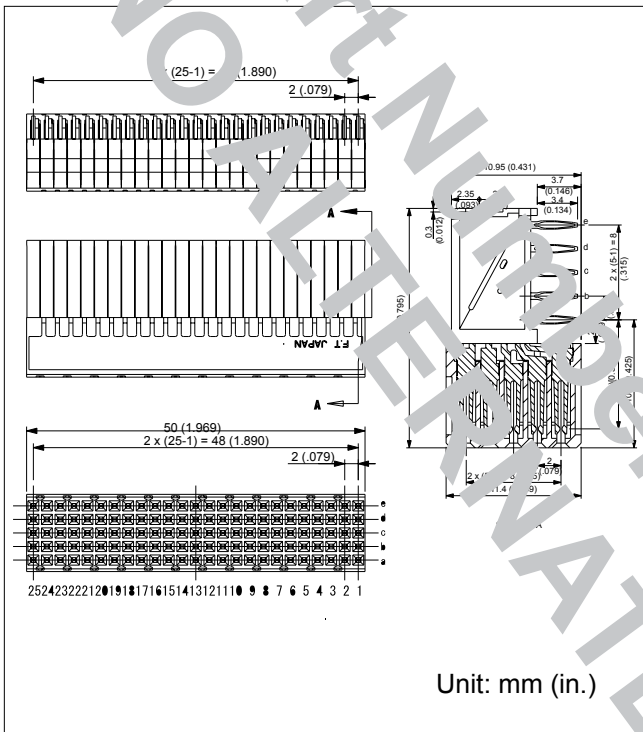
FCN-086J110-G/MSD-BCR (without key, bottom shield plate)



# FCN-086 / 087 Series

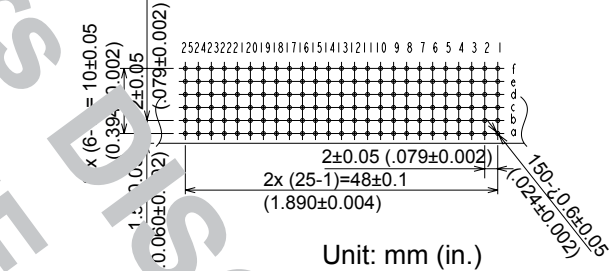
## SOCKET: 125 CONTACTS

### ■ DIMENSIONS



### ■ MOUNTING HOLE LAYOUT

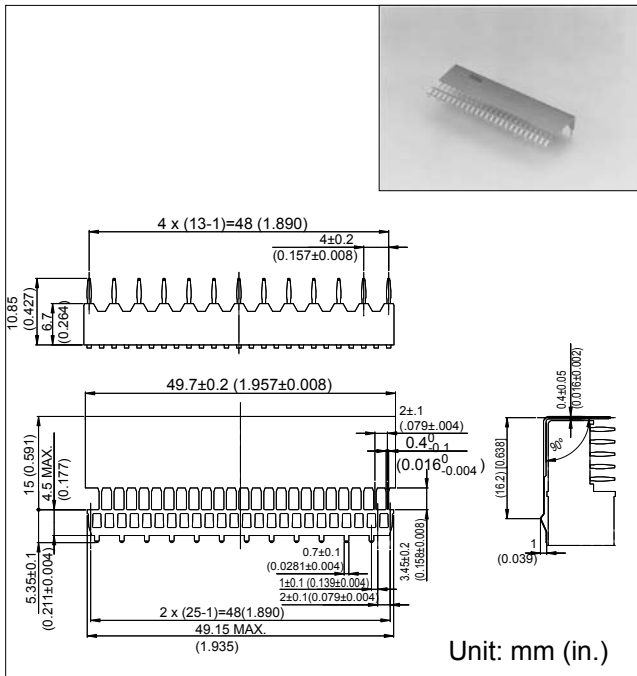
Thickness: 1.4 to 2.0 mm (.055 to .220 in.)  
 Drill hole Diameter:  $\varnothing 0.7 \pm 0.025$  mm (.028 in.)  
 Through hole diameter (after plating):  
 $\varnothing 0.6 \pm 0.05$  mm (.024 in.)



- ORDERING PART NUMBER: FCN-086J125-G/101-BCR  
 FCN-086J125-G/111-BCR (with pre-attached upper shield)

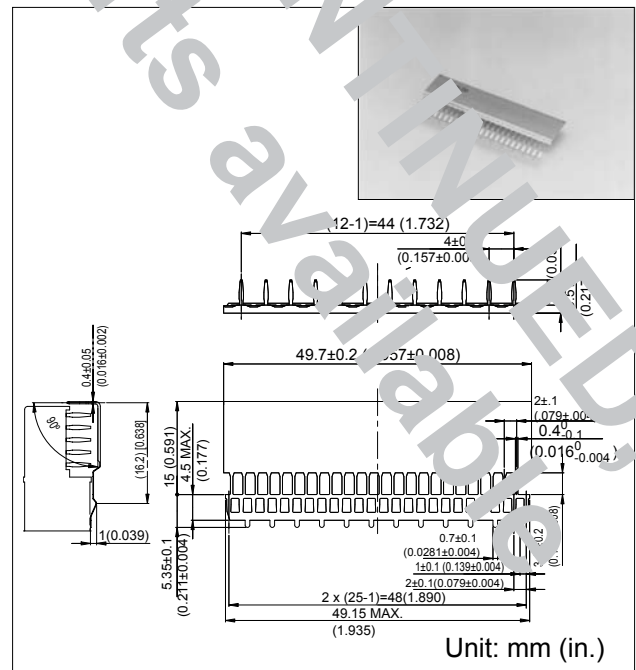
## SHIELD PLATE

### ■ DIMENSIONS



- ORDERING PART NUMBER:  
 FCN-086J125-G/USD-BCR (top shield plate)

### ■ DIMENSIONS



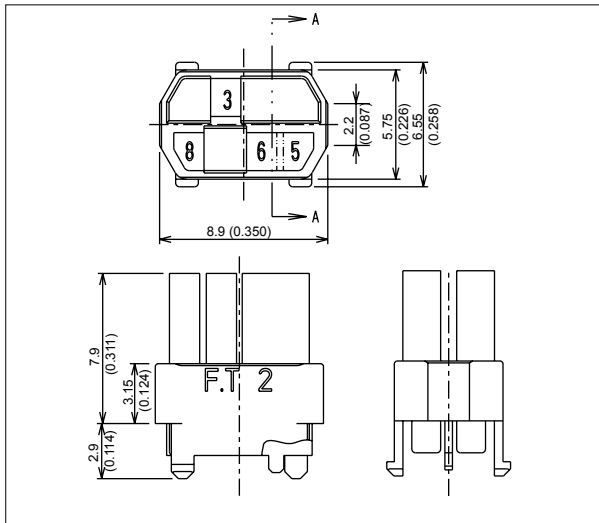
- ORDERING PART NUMBER:  
 FCN-086J125-G/LSD-BCR (bottom shield plate)



# FCN-086 / 087 Series

## CODING KEY

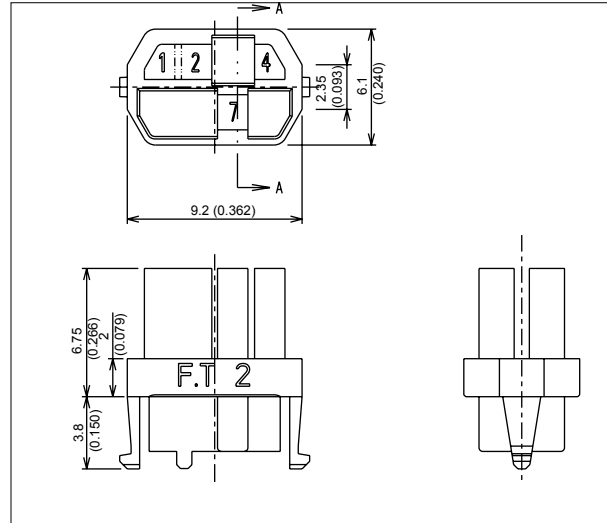
### ■ DIMENSIONS



### ■ ORDERING PART NUMBER: FCN-086A3568

Quanties: 50 pieces/package; minium order quantity: 500 pics

### ■ DIMENSIONS



### ■ ORDERING PART NUMBER: FCN-086B1247

### ■ COMBINATION OF CODING KEYS

| Plug     | Jack     | Color            | Plug     | Jack     | Color         |
|----------|----------|------------------|----------|----------|---------------|
| <br>1236 | <br>4578 | Nut brown        | <br>2578 | <br>1346 | Reseda green  |
| <br>1238 | <br>4567 | Ultramarine blue | <br>3467 | <br>1258 | Slate gray    |
| <br>1248 | <br>3567 | Strawberry red   | <br>3567 | <br>1248 | Antique pink  |
| <br>1268 | <br>3457 | Olive yellow     | <br>3568 | <br>1247 | Pastel orange |
| <br>1567 | <br>2348 | Brilliant blue   |          |          |               |

### ■ ORDERING PART NUMBERS:

Plug Coding Key: FCN-086A\*\*\*\*

Jack Coding Key: FCN-086B\*\*\*\*

\*\*\*\*: Add Coding Key number: eg: FCN-086A1268

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